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Glycerol-silicone elastomers – current status and perspectives

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Glycerol and silicone pre-polymer are two virtually immiscible liquids. However when sufficiently high shear forces are applied to a mixture of both then the glycerol phase breaks down to micro-size droplets evenly distributed within the silicone pre-polymer phase thus a glycerol-in-silicone emulsion is produced. Upon cross-linking of the silicone pre-polymer free-standing silicones with incorporated glycerol droplets are obtained as shown in Figure 1.^{1,2} Interestingly, mechanical properties of these composites are not compromised as the glycerol loading increases.

Glycerol-silicone elastomers became a platform for creating multiple functional smart materials, e.g. drug delivery wound care membranes, silicone foams, water absorbing silicones and magnetochromic films. Here some of the most interesting examples of glycerol-silicone elastomers applications will be presented and briefly explained elucidating the great potential of this counterintuitive composition.

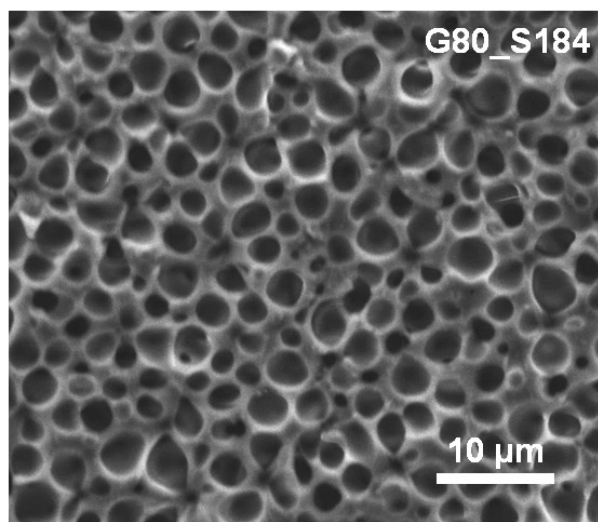


Figure 1. SEM image of a cured glycerol-silicone composite cross-section containing 80 weight parts of glycerol per 100 weight parts of silicone.

[1] P. Mazurek, S. Hvilsted and A. L. Skov, *Polymer*, **2016**, 87, 1–7.

[2] P. Mazurek, L. Yu, R. Gerhard, W. Wirges and A. L. Skov, *J. Appl. Polym. Sci.*, **2016**, 133, 1–8.